Danfoss

INT

EFET™ 535
Installation Manual

Warning!
This manual is only to be used by a
professional installer to install and
set up the thermostat properly.
It is <u>not</u> intended for the end-user!

Congratulations with…

... your Danfoss floor heating system
Your property has been installed with a Danfoss electric floor heating system. Danfoss is Europe's leading floor heating manufacturer, with over 45 years experience. We are confident that you will be satisfied with your new system.

Danfoss brings you…

An Invisible heating solution - A concealed heat source opens up greater opportunities for decorating and furnishing. Optimum comfort - Danfoss brings you the luxury and comfort of a warm floor as well as a pleasant room temperature. Floor heating is the most comfortable type of heating because it is based on the fact that warmth travels upwards; pleasant warmth for your feet, body and head.

Low running costs – Thanks to the precise Danfoss thermostat and the placement of the heating elements right under the floor surface the heat can be controlled optimally in order for you to have the comfort you desire with minimal energy use. Moreover electric floor heating is practically maintenance free, in total keeping down the running costs.

A long lasting solution - We back-up our floor heating solutions with a ten year guarantee on all our mats and cables, and a two year warranty on our thermostats. Practically speaking you can count on Danfoss heating cables and mats lasting as long as the house in which they are installed – and that is without having to maintain them.

Hygiene - As Danfoss produce floor heating systems, only very gentle air is circulating, and the amount of travelling dust particles is reduced considerably; a great relief for people with allergies or asthma. There are also no dangerous fumes such as carbon monoxide generated by the system.

Table of content

Install & configure the thermostat

Placement of EFET™ 535

When EFET™ 535 is used as a room sensor, installation height should typically be between 80-150 cm.

In wet rooms it should be installed on an even surface, according to local building regulations.

At least 50 cm away from windows/doors that will be left open occasionally.
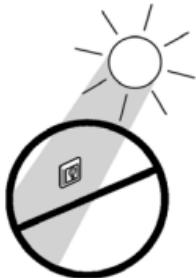
Not on a wall where it will be subjected to direct sunlight.

Not on the inner side of a wall facing the outside.

Installation and connection

Installation of EFET™ 535

1. To remove the front cover, gently press the release tabs under the bottom of the thermostat with a screwdriver. Then remove the front.
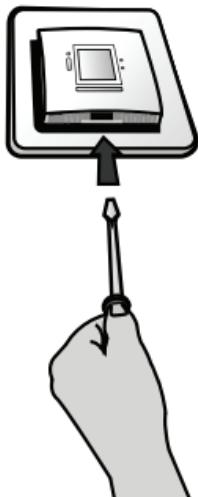
> **Removing the front cover and pushing the installation button, is not intended to be done by anyone else but a qualified installer!**

2. Connect the thermostat according to the connection diagram
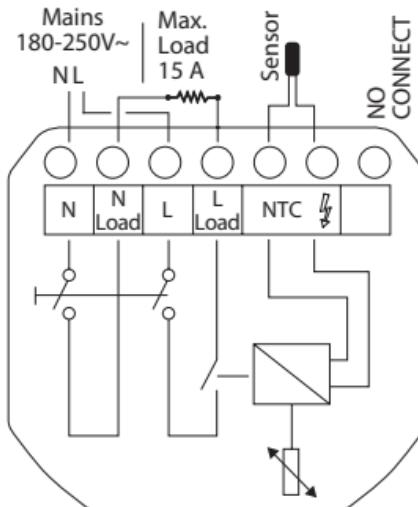
The screen of the heating cable must be connected via a terminal strip to the earth wire of the supply cable.

Choose sensor combination

3. Choose sensor combination
    When installing the EFET™ 535 you need to choose
    the type of heating and thus which sensors should be
    used. You have three options:

    Comfort heating: Constant temperature on the floor in
    bathrooms and other rooms where a comfortable warm
    surface is required.
    Install the Floor sensor and choose only the Floor sensor.

    Total heating: Control of room temperature in living
    rooms etc. Install the Floor sensor and choose both
   Floor sensor and Room sensor.

    No floor sensor: A floor sensor is not present, and
    cannot be installed. Choose Room sensor. (Not
    recommended).

    Be aware that without a floor sensor, the temperature
    control can be less accurate, and overheating of the
    floor is of higher risk.

    Danfoss recommends that a floor sensor is always
    installed.

**When the thermostat is used to control a floor heating
element according to EN/IEC 60335-1 and
EN/IEC 60335-2-96, always use the floor sensor
and never set the temperature limit above 35°C.**

Configuration - sensor
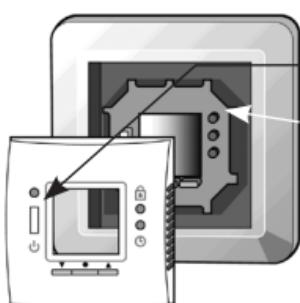
Selection of sensor type
Power on the thermostat.

With the front off, with a small screw-driver, pencil, or needle press the installation button.
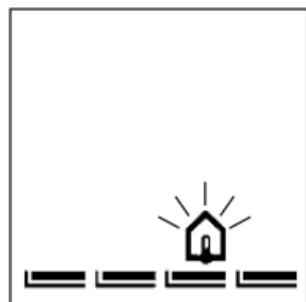
Select the sensors to be used for the heating system:
EFET™ 535 is able to use two sensors:
- a built-in room sensor
- an external sensor to be placed in the floor.

This gives 3 options:
- 🏠 floor sensor.
- 🏠 room sensor.
- 🏠🏠 both room and floor sensor.
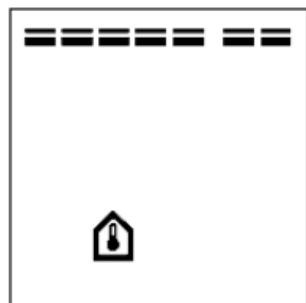
Always use floor sensor or a room + floor sensor combination when used to control floor heating

The default is 🏠
To change this setting, press● and use the arrow buttons ▲▼ to select your choice. Press● to accept your choice.
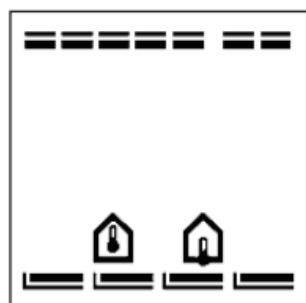
If you have selected room sensor only, the installation procedure is complete. Press installation button to accept. (Go to page 9).
If you have selected floor sensor or a combination of room- and floor sensor press ▲▼ for the next setting.

Configuration - Max. floor temp.

Maximum floor temperature. When selecting either ☖ floor sensor or ☖☖ floor and room sensors, next screen is maximum floor temperature.

Default setting is 35°C.

To change this setting, press ● and use the arrow buttons ▲▼ to select your choice. Press ● to accept your choice.
If you have selected a combination of room and floor sensor, the installation procedure is complete.
Press installation button to accept. (Go to page 9)
If you have selected floor sensor only press ▲▼ for the next setting.

When the thermostat is used to control a floor heating element according to EN/IEC 60335-1 and EN/IEC 60335-2-96, always use the floor sensor and <u>never</u> set the temperature limit above 35°C.

Notice:
The floor temperature is measured where the sensor is placed. The temperature of the bottom of a wooden floor can be up to 10 degrees higher than the top. Floor manufactures often specify the max. temperature on the top surface of the floor.
Please contact your floor supplier for maximum surface temperature.

Configuration - Scale
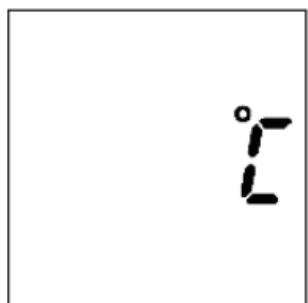
Scale
If you select EFET™ 535 to only use a floor sensor, mode ⌂, you have to select the display type. The choice is either numerical scale 1-6 or Celcius scale 5° to 45°.
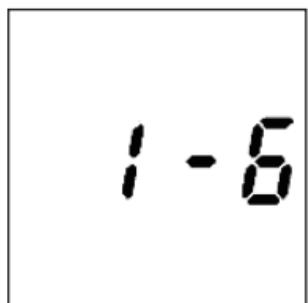
Default is Celcius scale. When selecting Celcius, the display will show the actual temperature at the floor sensor.

To change this setting, press● and use the arrow buttons ▲▼ to select your choice.

Press● to accept your choice. The installation procedure is now finished.

You can use the ▲▼ for going back or forward through the settings.
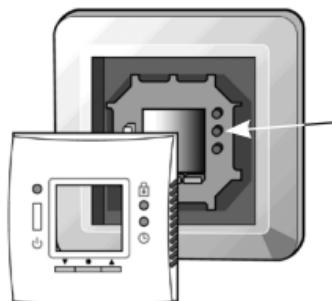
Otherwise:
Press the installation pinhole to exit installation mode.

4. Put the frame and front back on.

Initially mains supply the thermostat for 15 hours to fully charge the battery. The current time and day is then kept for 80 days if mains supply is off. All other settings are stored permanently.

User's guide to EFET™ 535

EFET™ 535 Introduction

EFET™ 535 is an electronic timer temperature controller, specially designed for floor heating systems.

The EFET™ 535, once set, automatically adjusts the heating to meet your comfort levels, regardless of changing weather conditions by measuring the floor temperature and combining it with the air temperature.

Even the programming of economy temperatures (i.e. lowering of temperature during the night and when you are out of the house) is very simple. Just tell the EFET™ 535 your daily rhythm and choose your program.

It also features a minimum floor temp. setting, eg. for keeping your tile floors warm in summer as well.

Display, icons and buttons

This is a safety switch, meaing all electrical supply to the thermostat is disconnected when turned off.

This is the standard display. The currently measured temperature is shown.

🌡 is shown to symbolize that current temperature is displayed, i.e. unit working as a thermometer.

The thermostat is operated with the 3 buttons below the display.

▾ down
▴ up
● select

Two pinhole buttons are available for dedicated features

🔒 Childproof. Locks all buttons.
🕓 Settings.

Increase / decrease temperature

The display indicates:

Weekdays

Settings

Room temperature

Frost protection

Childproof

Actual temperature is displayed

Floor temperature

Day rhythm periods and comfort / economy temperature

Maximum / Minimum

Increase / decrease preferred temperature.

Use the arrow buttons ▲▼ to either increase or decrease the temperature. The temperature is changed in increments of 0.1°C.

Notice that the temperature is flashing. Whenever something is flashing you are making changes.

When the preferred temperature is found you can save the setting in two ways

- Press ● to accept
- Leaving it flashing for 10 seconds.

If you try to increase the set point above the max. floor limit (p. 8) when thermostat is operating only on floor temperature, this icon will flash ⊼

Timer function

Using the timer function

The thermostat has a built-in timer function. A status bar in the bottom of the display gives an overview of timer status.
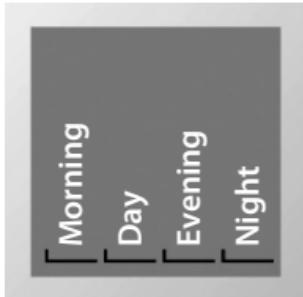
The day is divided into 4 time periods analogous to the typical day programming pattern:

- Morning

- Day

- Evening

- Night

These are indicated by the ⌞⎯⌟ as shown in the picture to the left. The start time of each of these can be configured.

The symbol can be:

⌞⎯⌟ Empty: Indicating that the thermostat is in economy mode.

▬▬ Full: Indicating that the thermostat is in comfort mode.

The 4 programs

4 different programs can be selected

| Program 1	Manual mode. The temperature is maintained constantly 24 hours all week.
Program 2 ▬L▬L	The temperature is lowered to economy temperature during the day and night period all week. P2 is a day program for e.g. working days where the temperature is decreased during the middle of the day and at night. In the morning and evening comfort temperature is preferred.
Program 3 ▬▬▬L	The temperature is lowered to economy temperature during the night period all week. P3 is a program for days at home where comfort temperature is preferred during the day and a savings temperature at night.
Program 4	A week program where: Mon – Fri: Program 2 and Sat – Sun: Program 3 P4 is a week program with Monday-Friday as workdays and Saturday-Sunday as days off. The top 7 bars indicate Monday through Sunday. On week days timer program 2 is used and in weekends timer program 3.

Factory setting is Program 1. Manual mode.

Factory settings

The factory setting of the timer is:

	Floor sensor only	Room sensor only	Floor and Room sensor
Temperature:			
Comfort	25℃	21℃	21℃
Economy	5℃	17℃	17℃
Periods – Day rhythm:			
Morning	06:00-08:00		
Day	08:00-16:00		
Evening	16:00-22:30		
Night	22:30-06:00		

You can use the above as it is, or you can change the settings to match your day pattern. See the chapter Settings – setting the timer periods, page 18.

Changing timer program
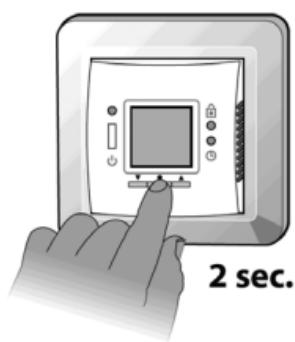
To change the program:
(Remember, you need to set the time in advance, p.17)

Keep the ● button pressed for 2 seconds.
The actual program starts to flash.
It is now possible to change the program by using the buttons ▲▼
Press ● to accept
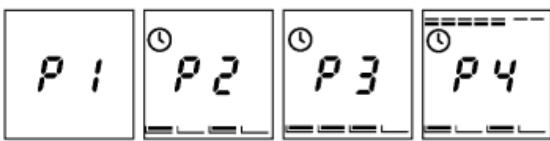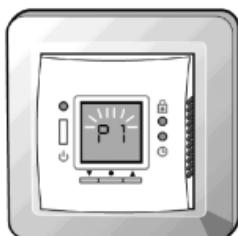
Changing timer program

During the timer programs, P2, P3, and P4, the flashing ⎵ indicates the actual time period.

In program 4 the actual day is also shown.

Using the arrow buttons ▴▾ in timer mode, is somewhat different from manual mode.

If you increase/decrease the temperature in a savings period ⎵ this change only applies to this current period, not any future savings periods. You might use this if you are eg. working at home in timer program 4.

If you increase/decrease the tempera-ture in a comfort period ▬ this change applies to all future comfort periods, until changed again. From the perspective that you are fine tuning the comfort temperature.

Settings overview

Settings

All settings are under ⏱ the settings menu. Here you set the following:

⏱ 17:23	- Time
☰──── ──	- Weekday

⏱ 06:00	⏱ 08:00	⏱ 16:00	⏱ 22:30
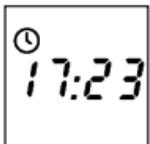
- Timer periods configuration
(Morning, day, evening and night)

22.7°	- Comfort temperature

20.0°	- Savings temperature

- -.- °	- Min. floor temperature limit

(Only when combination of room
and floor sensor is installed).

Changing the settings

You enter the settings by pressing the ⊕ pinhole with a small screw driver, pencil, or needle, the display now changes from temperature to time display.

By using the arrow buttons ▲▼ you move one way or the other in the menu.

Setting the time
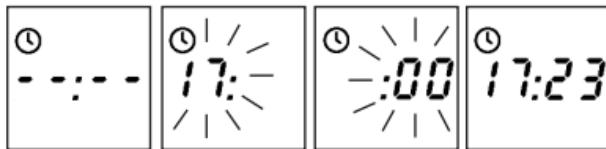
By pressing the ● the hours start flashing, indicating you can change them with the arrow buttons ▲▼
Press the ● again to change the minutes.
Battery Backup: The current time and day is kept for 80 days if mains supply is off. All other settings are stored permanently. Initially mains supply the thermostat for 15 hours to fully charge the battery.
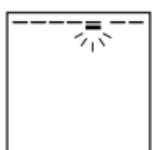
Setting the weekday
By pressing the ● the weekday starts flashing, indicating you can change it with the arrow buttons ▲▼ Press the ● to accept

Changing the settings

Setting the timer periods
When programming the starting times of the 4 periods keep in mind that the thermostat will start heating/stop heating at the given time. Therefore some periods should start and end before, to compensate for the time it takes to heat up or down.

The first period bar ⌴ flashes indi-cating this is the morning period.

By pressing the ● the start time of the period starts flashing. You change it with the arrow buttons ▲▼ in increments of 15 minutes.

Press the ● to accept

The second period bar ⌴ flashes indicating this is the day period.

Setting it in the same way.

The third period bar ⌴ flashes indicating this is the evening period.

Setting it in the same way.

The fourth period bar ⌴ flashes indicating this is the night period.

Setting it in the same way.

Note! When setting the time periods you cannot step backward to the previous time period, until the last one is set. This is to ensure that the periods do not overlap.

Changing the settings
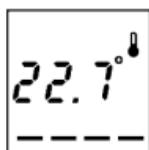
Setting the comfort temperature
By pressing the ● the preset comfort temperature starts flashing.

You change it with the arrow buttons ▲▼

Press the ● to accept

Setting the savings temperature
By pressing the ● the preset savings temperature starts flashing. You change it with the arrow buttons ▲▼

Press the ● to accept
It can also be set to OFF.
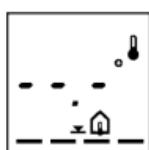
Setting the minimum floor temperature limit
If the thermostat is installed as a combination of room and floor sensor the minimum comfort temperature on the floor can be selected.

Setting this will overrule any other set point as you always want e.g. 20°C at the floor sensor

--.-° means that the function is disabled.

By pressing the ● the preset minimum floor limit temperature starts flashing.

You change it with the arrow ▲▼

Press the ● to accept

Special features

Childproof mode
You disable all buttons in child proof mode by pressing the pinhole button below 🔒 with a small screw driver, pencil, or needle.

A lock now appears in the display and all other buttons are locked now.

To unlock press the lock symbol again

Frost protection mode
To set the thermostat in frost protection mode, you hold down ▾ until you reach the lowest setting. Now press ▾ again to verify that you are not just changing the comfort or economy temperature, depending on the mode or timer period the thermostat is in.

The frost icon now appears and 5.0° flashes.

You accept the mode by

- Press ● to accept

- Leaving it flashing for 10 seconds.

The thermostat is now in frost protected mode. Actual temperature is shown.

You leave frost protection mode by pressing ▲ (0.5sec).

Special features

OFF mode
To set the thermostat in OFF mode, you hold down ▾ until you reach 5.0°. Now press ▾ again twice to verify that you are not just changing the comfort or economy temperature, depending on the mode or timer period the thermostat is in.

The display now shows OFF.

You accept the mode by

- Press ● to accept

- Leaving it flashing for 10 seconds.

OFF mode is used if you want to shut off the thermostat for a long period, but still keeping the time setting.
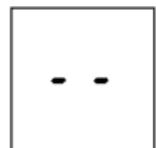
The thermostat is now in OFF mode. Two lines are shown in the display. You leave OFF mode by pressing ▴ (0.5sec).
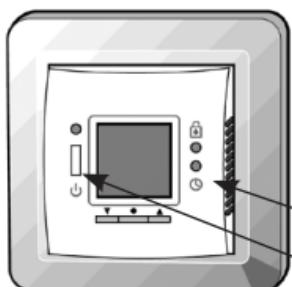
Restore timer default settings
To reset the thermostat to its timer defaults as shown on page 14, do the following:
1. Turn off the thermostat

2. While pressing the ⊙ pinhole button, turn on the thermostat. The LED will now flash red/green for 1 second indicating the thermostat will reset.

Special features / Trouble shooting

Switching displayed temperature
Depending on what mode the thermostat is installed as (floor, or a combination of floor and room) you can change which temperature is displayed.

If installed as a floor sensor system only, you can change the displayed temperature from floor sensor temperature to room sensor temperature, if you wish to use the thermostat as a thermometer. You change the display by pressing ▲ and ▼ at the same time for 2 seconds. The room sensor icon ⌂ is displayed.

You press them again to return to the default display.

If installed as a combination thermostat, by pressing ▲ and ▼ at the same time for 2 seconds, the temperature in the floor sensor is displayed for 2 minutes. The floor sensor icon ⌂ is displayed.

Trouble shooting

Clock symbol flashing:
Time settings were lost due to power cut.

The thermostat resumes to manual mode.

Trouble shooting

| E 4 | **E4 flashing in display:**
Error code 4 – The thermostat has overheated and has switched off
Let the thermostat cool for period. Then switch the thermostat off and on. |

| E 5 | **E5 or E6 flashing in display:**
Error code 5 - Floor sensor short circuited |

| E 6 | Error code 6 - Floor sensor disconnected.
Check connections, if they are OK, then disconnect the 2 sensor wires and connect an ohm meter to sensor wires.
Measure the ohm value and check with the values in the table in Technical Specifications below. |

Light Indications (LED)
The EFET™ 535 has a LED above the 2 pole safety switch.
The LED has five indications:

No light	The system is turned off.
Green light	System is standing by, set point temperature reached
Green light flashing	Floor sensor is defect
Red light	System is heating
Switching between red and green light	The floor temperature limit prevents the set point room temperature from being reached.

Technical specifications

Operation voltage	180-250 VAC, 50/60 Hz
Standby power consumption	Max. 0.30 W
Relay: • Resistive load • Inductive load	230V ~ 15A / 3450W cos φ= 0.3 Max. 4A
Sensing unit	NTC 15 kOhm at 25℃
Sensing values: • 0℃ • 20℃ • 50℃	42 kOhm 18 kOhm 6 kOhm
Hysteresis	± 0.2℃ with room sensor, ± 0.4℃ with floor sensor only
Ambient temperature	-10° to +30℃
Frost protection	5℃
Temperature range	5-35℃ with room sensor, 5-45℃ with floor sensor only. When used together with electrical floor heating elements, according to EN/IEC 60335-2-96 never adjust floor temperature above 35℃. Floor max. 20-50℃. Floor min. 10-35℃ only when installed with room and floor sensor combination
Sensor failure monitoring	The thermostat has a built-in monitoring circuit, which will switch off the heating if the sensor is disconnected or short-circuited
IP class	31
Dimensions	85 mm x 85 mm

Disposal Instruction

All electric or electronic equipment and enclosed batteries containing materials, components and substances that can be harmful to people's healthiness and to the environment, if the waste is not handled correctly.

All electric or electronic equipment and batteries is marked with the below crossed sign of a dustbin or garbage can. This sign symbolize electric or electronic equipment and batteries which are not allowed to be removed or disposed together with the unsorted waste, but have to be gathered individually.

Some batteries are also marked with a chemical symbol Hg (mercury), Cd (cadmium) or Pb (lead). These are very harmful substances and for this reason it is very important to collect these batteries.

As end user it is important for you to hand in your used batteries for recycling. In this way you actively take part to ensure that the batteries are reused according to the law and do not unnecessary impact on the environment.

All countries have established collecting points or other collecting arrangements, where citizens free of charge can deliver scraped electrical and electronic equipment together with batteries for recycling. More information can be obtained at your local authorities.

The 2 Year Danfoss Warranty:

You have purchased a Danfoss heating system which we are sure will serve to improve the comfort and economy of your application.

Danfoss provides superior electrical heating solutions for total climate control in and around homes and buildings. Danfoss offers a complete product program with ECFLEX heating cable or ECMAT heating mat, ECTEMP thermostats and Danfoss selflimiting heating cable combined with additional products completing the product program.

This 2 year warranty applies to all Danfoss products.

Should you, against all expectations, experience a problem with your Danfoss product, you will find that Danfoss offers a 2 year warranty from the date of purchase on the following conditions:

During the warranty period Danfoss shall offer a new comparable product or repair the product in case the product is found to be faulty by reason of defective design, materials or workmanship. Repair or replacement shall be carried out at Danfoss's discretion. Danfoss shall not be liable for any consequential or incidental damages including, but not limited to, damages to property or extra utility expenses.
This warranty shall only be valid on production of proof of purchase and must be submitted to the installer or seller without undue delay.

An extension of the warranty period following repairs undertaken under warranty cannot be granted.

The Danfoss Warranty shall not cover any damage caused by incorrect conditions of use, incorrect installation or if installation has been carried out by non-authorised electricians. All work will be invoiced in full if Danfoss is required to inspect or repair faults that have arisen as a result of any of the above.

The Danfoss Warranty shall not extend to equipment which has not been paid in full.

Danfoss will, at all times, provide a rapid and effective response to all complaints and inquiries from our customers.

The warranty explicitly excludes all claims exceeding the above conditions.

2 YEAR WARRANTY
Warranty Certificate

The Danfoss Guarantee is granted to:

Name:

Address:

City: Country:

Telephone:

Attention:
The Warranty Certificate must be completed correctly for
the Warranty to be valid.
Please read the Warranty conditions on the previous page.

Type of thermostat: Material number:

Electrical installation by: Date:

Suppliers Stamp
Date   /   -

Danfoss

Article No.: 088L4374

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